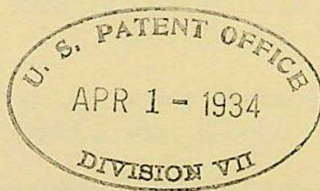


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THE BAUSCH & LOMB
MICRO MANIPULATOR
- - - -
DIRECTIONS FOR USE

also
aspirator injector
micro-pincette



BAUSCH & LOMB OPTICAL COMPANY
ROCHESTER, N. Y., U.S.A.

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THE BAUSCH & LOMB MICRO MANIPULATOR

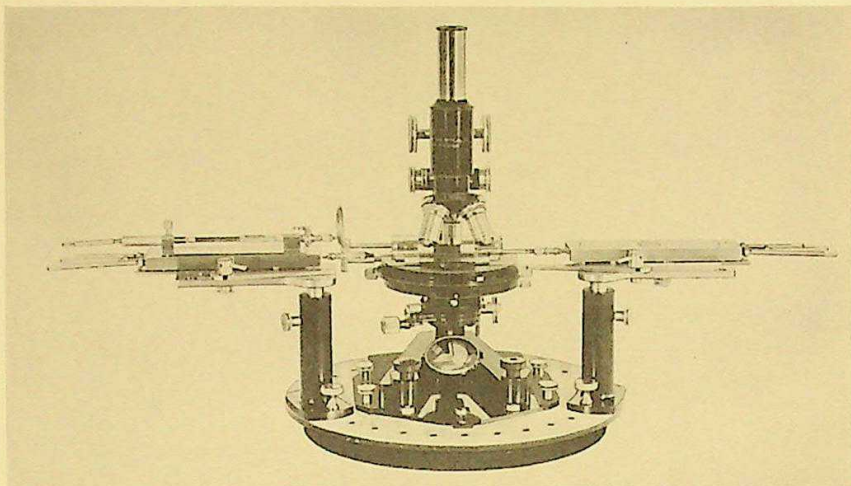
DIRECTIONS FOR USE

The wooden carrying case for this instrument contains the following items:

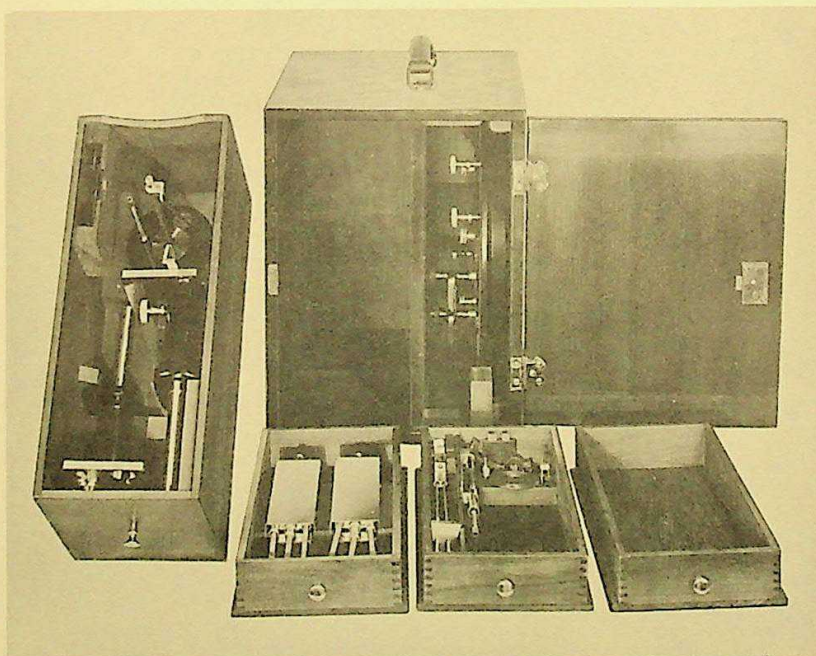
- 1 - Metal Base with adjustable microscope plate, Cat. No. 31-56-01 (Fig.3-A)
- 2 - Micro Manipulator Pillars,
Cat. No. 31-56-02 (Fig.3-B)
- 1 - Right Micro Manipulator,
Cat. No. 31-56-03 (Fig. 3-C)
- 1 - Left Micro Manipulator,
Cat. No. 31-56-04 (Fig. 3-D)
- 1 - Right Manipulator Bracket,
Cat. No. 31-56-08 (Fig.3-E)
- 1 - Left Manipulator Bracket,
Cat. No. 31-56-09 (Fig. 3-F)
- 4 - Adapters for dissecting needles,
Cat. No. 31-56-20
- 1 - Carrying Case,
Cat. No. 31-56-99

Figure 2 shows how these items are packed in the case. When replacing them, care should be used to place them in the positions shown.

Figure 2 shows also the following accessories not included in the standard equipment, but available upon special order.



The Bausch & Lomb Micro Manipulator with Microscope
FIGURE 1



The Bausch & Lomb Micro Manipulator in Case
FIGURE 2

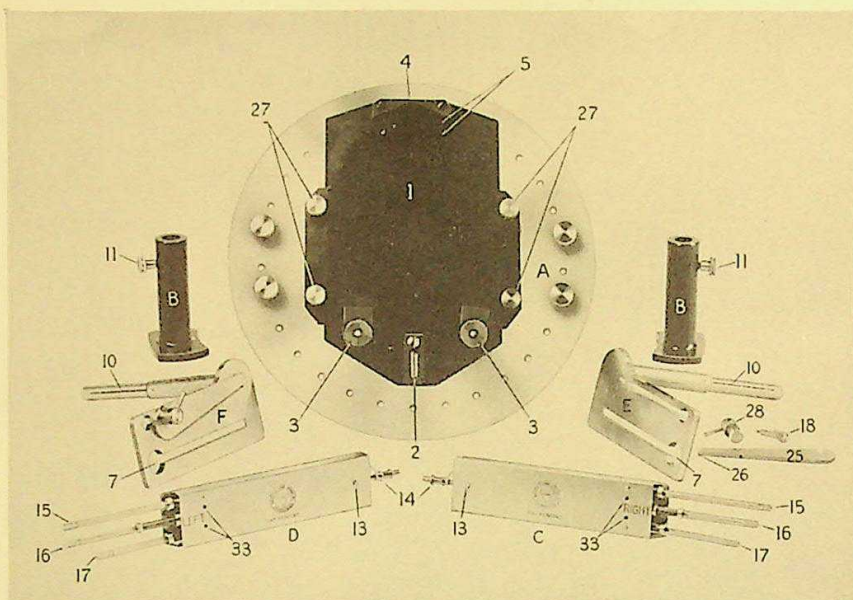
- 1 - Aspirator injector attachment,
Cat. No. 31-56-26 (Fig. 5)
- 1 - Micro-pincette,
Cat. No. 31-56-27 (Fig. 6)
- 1 - Medium Moist Chamber
Cat. No. 31-56-30
- 1 - Point Setting Gauge,
Cat. No. 31-56-33 (Fig. 7-H)
- 1 - Point Renewal Gauge,
Cat. No. 31-56-34 (Fig. 7-K)

UNPACKING AND SETTING UP

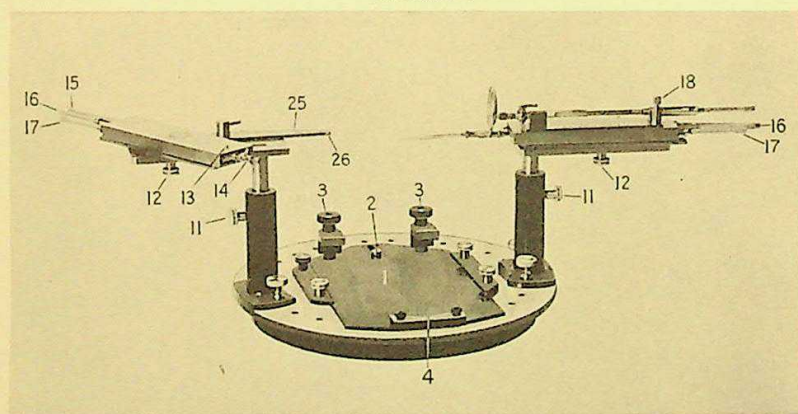
Refer to Figures 2, 3 and 4.

Remove the stop block which holds the base A in the case, by pulling it directly forward toward yourself. Place the base A on the table and put the microscope to be used on the black plate 1. Loosen the screws 3 and place the toes of the microscope base under them. Using a screw driver, move the heel-stop (4) up against the heel of the microscope base, using whichever of the three sets of tapped holes (5) is most appropriate. Clamp the heel-stop (4) tightly in this position. Now draw up the screws (3) snugly so that the microscope is firmly attached to the base plate (1).

By loosening thumb screws (27) and screw driver screw (2), the entire plate and microscope may be moved backward or forward. When the optical axis of the microscope is about in the center of the base or in any other position that experience shows to be desirable, the screws (27) should be



Parts of the Bausch & Lomb Micro Manipulator
FIGURE 3



The Bausch & Lomb Micro Manipulator
with Aspirator Injector in place
FIGURE 4

- | | |
|-------------------------------|--|
| A - Base | 11 - Table Adj. Screws |
| B - Pillars | 12 - Thumb Nut |
| C - Right Micro Manipulator | 13 - Locating Screw |
| D - Left Micro Manipulator | 14 - Implement Tip |
| E - Right Manipulator Bracket | 15 - Spring Handle (Raising & Lowering) |
| F - Left Manipulator Bracket | 16 - Spring Handle (Push & Pull) |
| 1 - Base Plate | 17 - Spring Handle (Lateral Movement) |
| 2 - Screw Driver Screw | 18 - Clamping Screw |
| 3 - Toe Clamp Screws | 25 - Position Duplicator |
| 4 - Heel-stop | 26 - Position Stop |
| 5 - Tapped Holes | 27 - Thumb Screws for holding Base Plate |
| 7 - Circular Opening | 28 - Position Duplicator Clamp Screw |
| 10 - Spring Post | 33 - Locating Holes |

again clamped. The plate stop under screw (2) should now be moved into contact with base plate (1) and clamped by tightening screw-driver screw (2). It will be seen that so long as this plate stop and the heel stop (4) are not disturbed, the microscope may be removed and replaced in the same position by merely using care in placing the heel of the microscope against (4) and the plate (1) against the plate stop under (2).

Place the two pillars (B) on the base and attach them with the thumb screws shown and provided. They may be placed in any of the holes near the periphery of the base, permitting attack of the specimen from any desired azimuth.

The two micro manipulator brackets (B) should now be introduced into the pillars and clamped at the proper height with screws (11). Place them so that the position duplicator 25, 26 for the micro manipulators is on the side farthest from the operator and the greatest overhang is away from the microscope. See Fig. 4.

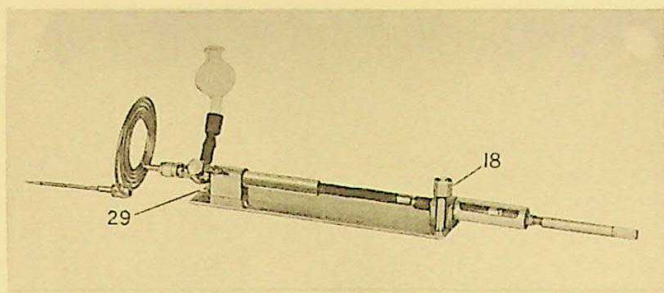
The two micro-manipulator mechanisms may now be attached, the one marked LEFT on the left bracket and the one marked RIGHT on the right bracket.

Unscrew the thumb nut underneath (12, FIG. 4) part way and pass it through the circular opening (7). Be sure the washer on the screw passes through the opening. Advance the manipulator toward the microscope the proper distance as determined by the length of tool to be used or other conditions and clamp by tightening nut (12). When the positions of the micro manipulator mechanisms are finally determined, place the

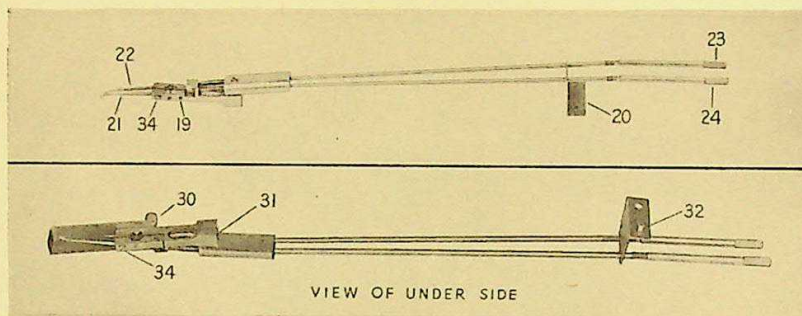
position duplicator 25, against it so that the position stop 26 locates it in the longitudinal direction and that its position in a direction away and toward the operator is defined by the inner side of the plate (25). Clamp by tightening (28). The position duplicator 25, after location and clamping, permits replacement of the micro-manipulator mechanisms to the correct position should it be necessary to remove them to dress or replace tools or for any other purpose. The tools (Micro-Pipettes etc.) are made of glass tubing of such an internal diameter that it will slip over the end of the tool tips and rest against the shoulder. The glass tool should be cemented to the tip with a bit of sealing wax or De Kohtinsky cement.

The movement of the tools is accomplished by the rotation of the spring handles (15, 16 and 17). Push and pull movement is provided by 16, raising and lowering by (15) and lateral movement by (17). The total range of these movements is about 6 millimeters and their rates will be equal when the tools are 82.5mm (3-1/4 inches) long to the end of the metal tip. The rate of motion for 16 (push and pull) is 0.14mm per turn.

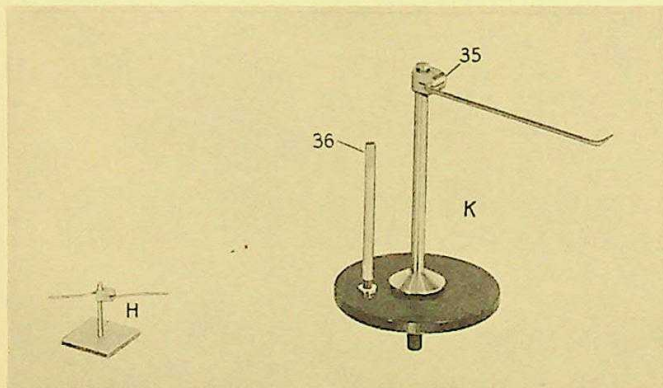
The direction of attack in azimuth may be varied to almost anything desired, by making angled tools and by placing the two pillars (B) in suitable different positions on the base. Suitable tapped holes are provided in the base. If it is necessary to attack the specimen under a vertical inclination special pillars may be secured. They are made only on special order. The purchaser is required to specify the angle of inclination desired.



The Aspirator Injector
FIGURE 5



The Micro Pincette
FIGURE 6



H - The Point Setting Gauge
K - The Point Renewal Gauge
FIGURE 7

- | | |
|--------------------------------------|-------------------------------|
| 18 - Clamping Screw | 29 - Small Notch |
| 19 - Hole | 30 - Knurled Head Screw |
| 20 - Bracket | 31 - Socket for Implement Tip |
| 21 - Stationary Jaw | 32 - Pin Screw |
| 22 - Movable Jaw | 34 - Screws for clamping tips |
| 23 - Handle for up and down movement | 35 - Friction Joint |
| 24 - Handle for lateral movement | 36 - Vertical Handle |

THE ASPIRATOR INJECTOR ATTACHMENT

This attachment (FIG. 5) is attached to either the right or left micro manipulator as desired, by engaging the small notch (29) at the front under the head of the screw (13) on the manipulator. This screw (13) is not to be tightened. The screw (18) is introduced now to clamp the aspirator to the micro manipulator. The spirally coiled tube may best be removed from the aspirator before its attachment, but it should be placed on it after clamping to the micro manipulator base. FIGS. 4 and 5 show clearly how this spiral tube is to be attached to the aspirator and the micro manipulator tip, and the injector needle in place.

The reservoir is fitted with a three-way valve. It is so arranged that the valve is open in a direction parallel to its handle.

Fill the reservoir with liquid while the valve handle is parallel with the syringe (the position in Fig. 5). After loading the reservoir, turn the flexible handle to the left as far as it will go without forcing it, that is, screw the plunger as far out of the syringe as is safe. Now turn the valve handle parallel to the rubber reservoir connector (90° to the position shown in Fig. 5). Push the plunger in as far as it will go by pushing on the flexible handle. This will expel air from the syringe, through the reservoir. Now draw the plunger back again during which operation liquid will be drawn into the syringe. In general there will be an air bubble between the liquid and the plunger. Work the plunger back and forth until all of this bubble is expelled through the reservoir.

When this has been accomplished turn the valve handle to the position shown in Fig. 5 and force the plunger into the syringe. This will force liquid through the spiral tube and the injector needle.

Mass injections may be made by pushing the plunger in while micro injection may be accomplished by rotating the flexible handle. Each rotation of the handle advances or retracts the plunger 0.58mm depending on whether the movement is clockwise or counter clockwise. The quantity of fluid injected or aspirated is 7.3 cubic millimeters for each complete revolution.

THE MICRO PINCETTE

This is illustrated in Fig. 6. The pincette jaws are protected from injury by a metal sheath which is attached by a knurled head screw (30) which fits into the hole (19). This sheath must be removed of course, before the pincette is attached to the instrument, and should always be replaced upon removal. The pincette is attached in much the same manner as the aspirator injector. The socket (31 Fig. 6) fits the implement tip 14 (Fig. 3). The pincette should be snugly set up on it. The pin screw 32 (Fig. 6) should be dropped into one of the holes 33 (Fig. 3) and the screw (18) introduced into the other one. One of the jaws of the pincette 21 (Fig. 6) is fixed and stationary while the other 22 is movable up and down upon rotation of handle (23) and laterally by means of (24). The little screws (34) serve to clamp tips into the pincette.

THE POINT SETTING GAUGE

This accessory, Fig. 7-H, is used to adjust the tips of the manipulator instruments to the height of the lower side of the cover glass of the moist chamber. It is placed on the stage of the microscope and is so adjusted that its point is at the height of the lower side of the cover glass, after which it may be moved to any other convenient position on the stage and the height of the dissecting needle, aspirator or other tool is adjusted to the same level as the point of the gauge. The gauge needs only one setting or adjustment after which it may be used for fitting any of the tools throughout that period of manipulation or until the moist chamber is changed. Care must be used however, to avoid accidentally changing its setting. If such accidental change is suspected, the setting should be checked.

THE POINT RENEWAL GAUGE

This accessory, Fig. 7K is used when it becomes necessary or desirable to change points. It is placed on the base of the Micro Manipulator and the point of it is adjusted to the height of the tip of the implement to be removed from the instrument. The point of the gauge is then swung out of the way without disturbing the position of the base of the gauge on the base of the micro manipulator, and the new tool placed. The point of the gauge is now swung back and the height of the tool adjusted to it.

There are two adjustments for height. The Pointer is supported on a friction joint (35) and gross adjustments may be made by simply twisting the pointer about this axis.

A vertical handle (36) parallel to the center column of the gauge provides means for fine adjustment upon rotation. As indicated above the entire gauge point with its friction joint may be rotated about a vertical axis without altering the height of the adjusted gauge point to get it out of the way during the change of implements.

There is a detent provided under the flange at the base of the vertical post which permits the return of the point to the same position in azimuth. Care should be used not to move the gauge or to alter the point setting accidentally while implements are being changed.

